

Virtual medical cabinets- still a shy presence in Romania

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Abstract

The article begins by presenting the actual situation of the Romanian virtual environment in the field of virtual medical cabinets, as a part of e-business of B2C type; then, it continues with a presentation regarding the conceiving, projecting and implementation mode of an e-business prototype, more exactly a virtual medical cabinet. The article ends not only by giving solutions concerning the weak points of this field, but also by indicating some of the future directions for the research in the Romanian virtual environment, which is developing.

1. Introduction

A Romanian virtual world has appeared and developed in a period when the Romanian society has suffered radical changes. This new world borrowed the functioning principles from the most developed countries, where there already existed virtual worlds. Businesses developed in a shy way, in a long period of time, becoming more mature until now.[18][13][14] In the Romanian e-business, the most successful was the B2C model.

In Romania, the virtual medical cabinets have developed starting from personal web sites and adding new facilities, obtaining this way an e-business model. The important value [2][3][14] of this business type is due to the fact that:

- It offers pieces of information from various medical domains, that anybody can understand;
- It offers the possibility to compare medical services, from all the points of view;
- It offers a fast and flexible way of communication;

- It furnishes the medical results of patients in real time;
- It surveys patients at their domiciles;
- It offers a real time connection among the patient, the doctor and the analysis centre.

The most important function of the cabinets which are using this type of business is to provide a vast offer by integrating processes which are normally used in this type of business. Virtual medical cabinets offer to their patient's real time surveillance and implicitly an independent way of life, and to the doctors a greater number of patients and the possibility of keeping contact in real time. By eliminating the geographical barriers and extending markets, there are new partnerships and connections, which could not be created by other ways.

2. The description of the prototype

In this article, the e-business model proposed is a virtual medical cabinet which has as activities informing, programming and furnishing the diagnosis for patients.

The necessary steps in creating a virtual medical cabinet are:[14][13]

- The creation of commerce with the main activity medical assistance. The documents needed for creating a virtual shop are the same as the ones for creating a commerce;
- Buying a domain name;
- Creating the site.

The scenario of the virtual cabinet that we will project and implement in this article is:

- The construction of the virtual cabinet using dynamic web pages with the scripting language PHP;
- Stocking information concerning the patients in order to be able to personalize the web

pages taking in charge the preferences of each patient;

- The presentation of the activity domain;
- Furnishing information regarding the scientific and professional activity of the doctors;
- The administration in real time of patients' treatments;
- Winning the trust of patients by securing the site;
- Providing the necessary means so that the patients could communicate with the doctors;
- Insuring the functionality of the direct marketing;
- Ways of stocking data such as authentication, patients' files, diagnostic, etc.;
- Ways of accessing data in a dynamic mode;
- The administration of patients, programming and system;
- The medical cabinet provides means for direct communication with the patient and ways of direct interaction with the patient in function of his geographical position;
- The traffic and volume analysis of realized transactions in order to know patients' behaviour and if the site is adapted for their needs.

Basing on this scenario, we will describe the projection and implementation activity of a virtual medical cabinet's prototype, which responds to the level of developing countries, as Romania.

3. Projecting and implant a virtual medical cabinet through the PHP

The main idea of this implementation is: the virtual cabinet will permit the creation of a connection between the patients and the doctors. The patient needs to get a meeting with the doctor, after which there will be established a diagnostic and a treatment. For the surveillance process, as well as for the stage evolution of the patient, the pages of the virtual cabinet will be used.

The cabinet was created in two parts: the front-end, designated for the patients, and back-end, for the administrator.

The first step in creating the prototype is choosing the necessary instruments, such as: the scripting language PHP, the database created with MySql Front and the web server Apache.

The database's structure of our virtual cabinet needs to have at least the following fields:

Patients' table

| Idpatient | Last Name | First name | Age | Address | Symptoms | E-mail |
|-----------|-----------|------------|-----|---------|----------|--------|
|-----------|-----------|------------|-----|---------|----------|--------|

Doctors' table

| Iddoc tor | Last name | First name | e-mail | Specialization | Scientific activity | Medical information |
|-----------|-----------|------------|--------|----------------|---------------------|---------------------|
|-----------|-----------|------------|--------|----------------|---------------------|---------------------|

Treatments' table

| idpatient | Iddoctor | Diagnostic | Treatment |
|-----------|----------|------------|-----------|
|-----------|----------|------------|-----------|

Meetings' table

| Idpatient | Iddoctor | Day | Month | Year | hour |
|-----------|----------|-----|-------|------|------|
|-----------|----------|-----|-------|------|------|

Password's table

| UserID | Type |
|--------|------|
|--------|------|

Visit situation

| Id | Pagename | platform | referrer | Time | Date | Host |
|----|----------|----------|----------|------|------|------|
|----|----------|----------|----------|------|------|------|

The first page of the virtual cabinet contains identification data, for the customers and for the doctors. From this page, the patient chooses the name of the doctor with whom he wants an appointment, which will generate the page below:



Figure 1: Details on a doctor's page

Using the scripting language JavaScript, we created on the virtual cabinet a vertical mobile menu, which helps to navigate on all pages. The menu allows the patient to obtain all information about the doctor chosen. If he wants to see the doctor's scientific activity, he has to select from the menu the option having this name, action that will provide the page below:



Figure 2: Scientific activity

The patient has the possibility to inform himself concerning the studies, specializations and qualifications of the doctor chosen in the first page. (Figure 3)



Figure 3. Studies, specializations, qualifications

The application virtual medical cabinet contains a medical informing section, where there can be found pieces of information from the medical field. The web page presented in Figure 4 contains information not only about the mammar cancer, but also about the important role of the ecograph in finding and treating this disease.

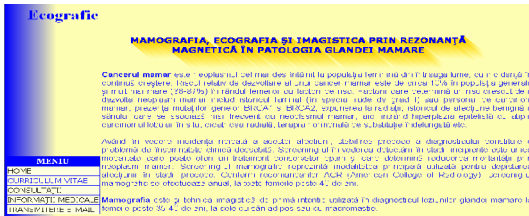


Figure 4. Medical information

While creating this application, we thought that there will be a physical meeting between the patient and the doctor, in order to determine the diagnostic and to find the treatment; this is a reason why we considered necessary the existence of the following two pages:

The page called *consultations*, presented in Figure 5, which contains details concerning the day and the hour of consultation for each doctor, and also the type of investigation that can be realized during a precise period.

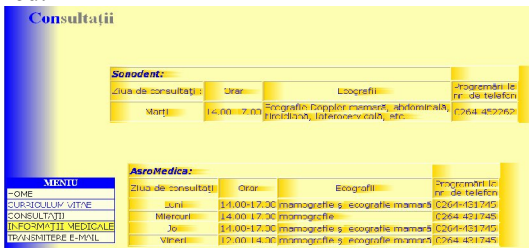


Figure 5. Consultations' timetable

2. The page called *appointments*, presented in Figure 6, the patient fixes a meeting by completing each field of the form and by choosing a date and an hour that he prefers.



Figure 6. Appointments

The action of getting an appointment by a patient needed verification, not only of the data he introduced in the required fields, but also of the fact that the day and hour are not already taken by another patient. These verifications have been done using the following code:

```

$ok=0;
$sqlString = "select * from programari";
$resursa=mysql_query($sqlString);
while($srow=mysql_fetch_array($resursa))
{ if (($srow['nume']==$nume)) {
    $ok=1;
    displayheader();
    echo "<font size='4'><b>It already exists a patient at this date and hour.</b><br><br><font size='2'>Press <b>back</b> to return to the menu and get another appointment.<br><br>";
    echo "<hr color='#cccccc' size='1' noshade>";
    exit;
}
if (($srow['ora']==$ora)&&($srow['ziua']==$marti)&&($srow['luna']==$luna)&&($srow['an']==$an)) {
    $ok=1;
    displayheader();
    echo "<font size='4'><b>Introduce another hour; appointment already existing.</b><br><br><font size='2'>Press <b>back</b> to return to the menu.<br><br>";
    echo "<hr color='#cccccc' size='1' noshade>";
    exit; } } ?>
    
```

In case the patient makes mistakes by completing the form, an error page will appear on his screen. Generating the error page with PHP was made using a function which creates a HTML page, containing the error message, and the return to the register page is made by clicking the "Back" button from the browser.

```

function displayheader()
{echo "<html>"; echo "<head>"; echo "</head>";
echo "<body bgcolor='white'>";
echo "<div style='position:absolute; left: 4; top: 70; align=left'>";
echo "<IMG SRC='imagini/titlu.gif' width='158' height='85' left=0'>"; echo "</div>";
echo "<table border='0'>";echo "<tr>";
echo "<td valign='middle' nowrap'>";
echo"<h2><div><font color='red'size='6'> <b> <i> ERROR!!!</i></b></font></div></h2><br><br>";
    
```

```
echo "</td>";echo "</tr>";echo "</table>";
echo "<hr color=#cccccc size=1 noshade>";
echo "<div align = 'center'>"; echo "</html>";}
```

Every information introduced in the fields of the form will be tested; in case there is incompatibility, the script execution will end using the instruction *exit*; of PHP language, as following:

```
if ($newusername=="")
{ displayheader();
echo "<font size=4' color='blue'><b>Please introduce
username..</b><br><br>
<font size=2'>Press <b>back</b> to go back to the
form.<br><br>";
echo "<hr color=#cccccc size=1 noshade>"; exit; }
```

The error page created using the code above is presented in Figure 7.

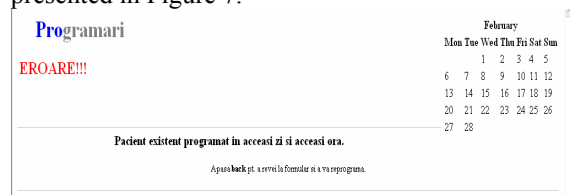


Figure 7. Error Page

The evolution of patient's disease will be real time followed by an online communication between the patient and the doctor and the other way around. The e-mail section offers the possibility to the patient to send e-mails to the doctor. Its purpose was to offer to each patient medical assistance real time. This section can be visualized by selecting the link "Send e-mail" from the vertical menu, action that will generate the apparition of the e-mail window on the screen, as it is shown in Figure 8.



Figure 8. Send e-mail

Sending e-mails from PHP pages is possible due to the PHP standard configuration, which accepts sending this type of messages by SMTP. SMTP is the standard protocol used to transmit messages between two systems, using Internet. To send a message from the PHP page, the mail() function is called, as it follows:

```
<?php
$To =trim($_POST['To']);
$From =trim($_POST['From']);
```

```
$FromName=trim($_POST['FromName']);
$Subject =trim($_POST['Subiect']);
$message = trim($_POST['Corp']);
$headers = "From: $From\r\n"."FromName:
$FromName\r\n";
$success = mail($To, $Subject, $message,
$headers);?>
```

In order to access the virtual shop's administration zone an authorizing page was created with the purpose to allow access on these pages only to authorized persons. For each authorized person, a work session will open so that the person can develop the activity needed. After ending any type of activity, this person will be able to end the session by clicking the "End session" button, which is found on the menu of every administration page. The access to the virtual cabinet's administration pages was restricted so that they cannot be accessed directly from the browser. The only way to access the administration pages is by activating the Login page, which has the format shown on Figure 9.



Figure 9. Login Page

The administrator has all the instruments needed to manage the medical products and services and also the patients of the virtual cabinet

4. Conclusions

In this article, we created a virtual medical cabinet prototype, which can be used by any Romanian medical cabinet that would like to unfold its activity on the Internet. While projecting and implementing this virtual medical cabinet, we had in consideration the available instruments at this moment in Romania, but also the unsolved problems in the Romanian virtual environment. As a result, we obtained a medical site's prototype, which could have a real success on the Romanian e-market and not only.

In our opinion, virtual medical cabinets' success depends on the continuous improvements of the programs used for the medical services on the screen and also of those connected to the real time patients' consultations. In order to change the mentalities of the patients who are adepts of the classical cabinets, the virtual medicine should offer a more practical and cheaper way of giving medical services to the patients.

Internet has a horizontal dimension, which gives the patient the power to negotiate, which allows him to expect improvements of the medical services offered by the virtual medical cabinets. We consider that this fact has a decisive role in changing old mentalities and in accepting something new, meaning the virtual medical cabinets, by the patients, this being the most performing and cheapest way in the world of interact between a patient and a doctor.

In our future researches, we proposed ourselves to create a virtual medical cabinet able to take in charge more and more functions of a physical cabinet, in order to get Romania in line with the other developed countries.

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